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INSECTS OF SAMOA

AND OTHER SAMOAN TERRESTRIAL ARTHROPODA

PART VII. OTHER ORDERS OF INSECTS

FASC. 2. Pp. 45–76

PLECTOPTERA

By R. J. TILLYARD, Sc.D. (Cantab.), F.R.S., and J. A. LESTAGE

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By P. A. BUXTON, M.A.

THYSANOPTERA

By RICHARD S. BAGNALL, F.R.S.E., F.L.S.

WITH EIGHT TEXT-FIGURES

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INSECTS OF SAMOA
AND OTHER SAMOAN TERRESTRIAL ARTHROPODA

Although a monograph, or series of papers, dealing comprehensively with the land arthropod fauna of any group of islands in the South Pacific may be expected to yield valuable results, in connection with distribution, modification due to isolation, and other problems, no such work is at present in existence. In order in some measure to remedy this deficiency, and in view of benefits directly accruing to the National Collections, the Trustees of the British Museum have undertaken the publication of an account of the Insects and other Terrestrial Arthropoda collected in the Samoan Islands, in 1924-1925, by Messrs. P. A. Buxton and G. H. E. Hopkins, during the Expedition of the London School of Hygiene and Tropical Medicine to the South Pacific. Advantage has been taken of the opportunity thus afforded, to make the studies as complete as possible by including in them all Samoan material of the groups concerned in both the British Museum (Natural History) and (by courtesy of the authorities of that institution) the Bishop Museum, Honolulu.

It is not intended that contributors to the text shall be confined to the Museum Staff or to any one nation, but, so far as possible, the assistance of the leading authorities on all groups to be dealt with has been obtained.

The work will be divided into eight "Parts" (see p. 3 of wrapper), which will be subdivided into "Fascicles." Each of the latter, which will appear as ready in any order, will consist of one or more contributions. On the completion of the work it is intended to issue a general survey, summarising the whole and drawing from it such conclusions as may be warranted.

A list of Fascicles already issued will be found on the back of this wrapper.

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INSECTS OF SAMOA

Part VII. Fasc. 2

PLECTOPTERA (MAYFLIES)

By R. J. Tillyard, Sc.D. (Cantab.), F.R.S., Chief Entomologist, Commonwealth Council for Scientific and Industrial Research

(With 2 Text-figures.)

The material collected in this Order consists only of three specimens belonging to a single species of *Cloëon*, viz. a male imago, a female imago and a male subimago. These are all dried specimens, pinned, and with the wings considerably damaged. Such material is not very satisfactory for description in this Order, especially in the case of small, delicate insects like the Baëtidae, which need to be preserved carefully in alcohol. The right forewing of the female imago is the only wing sufficiently well preserved to give the complete venation; this is shown in Text-fig. 1. In order to describe the genitalia, the dry and rather shrivelled end-segments of the abdomens of both male and female imagines were cut off and macerated in 10 per cent. caustic potash; the very brittle cerci were already badly damaged.

The colours in the living insects of this genus are often very different from those of the dried specimens. No notes were taken of the colours in life, so that it is only possible to state the colouring after death.

BAËTIDAE.

1. Cloëon samoënse, sp. n. (Text-figs. 1, 2).

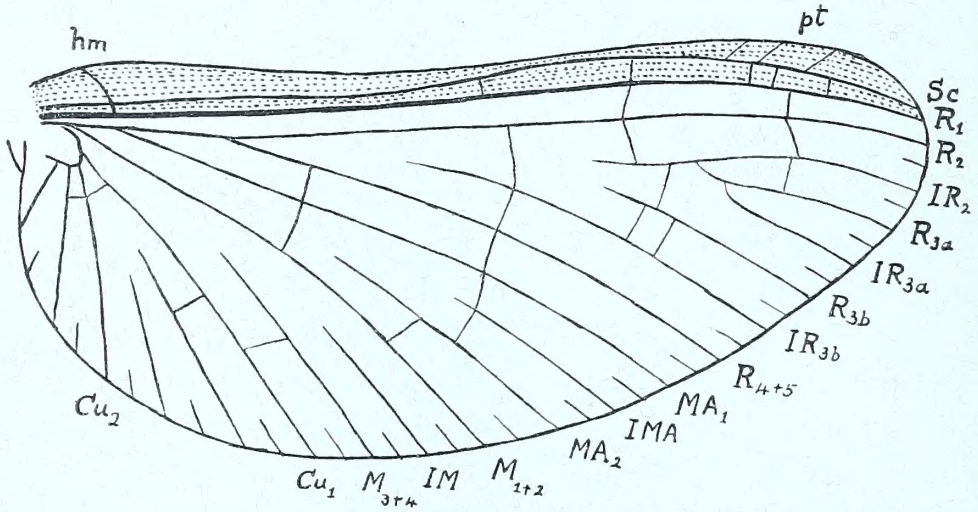
♂ *Imago* :—

Forewing 4·5 mm.

General body colouring dark chocolate brown; cerci pale semi-transparent brownish; wings hyaline with blackish veins.

Head with enormous divided eyes, black, the turban-eyes (collapsed) on broad bases; antennae with very short, broad scape, slender pedicel, and slender, delicate, indistinctly segmented flagellum.

Thorax dark brown without any definite pattern; legs brownish, but with the fore femora paler, mostly straw-coloured, the same colour being most



TEXT-FIG. 1.—*Cloëon samoënse*, sp. n., allotype ♀, forewing. Length 5·7 mm. New Notation. the prefix *I* indicating interpolated veins; *MA* anterior or convex portion of media; *M* posterior or concave portion of same.

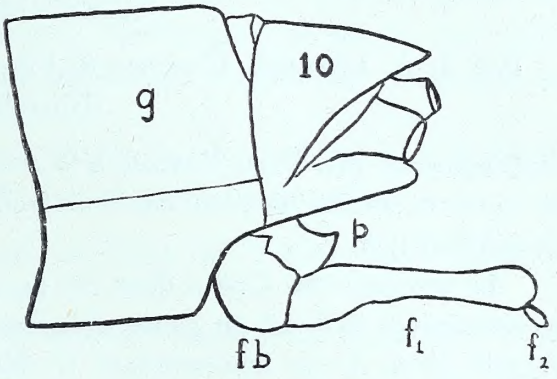
prominent around the under side of the knee-joint and extending along the basal portion of the tibia also; claws of the fore tarsus very strongly dissimilar, the outer narrow, sharply pointed, the inner broad, subtriangular, with its exterior edge straight, its interior edge long, sub-crenulate, extending to below the middle of the outer claw.

Wings.—Forewing (somewhat crumpled) hyaline with blackish venation except only C, Sc and R_1, which are more brownish. Venation much as in the female (Text-fig. 1), but pterostigmatic region broader, with only two cross-veins between C and Sc and a single one between Sc and R_1. Hind wings absent.

Abdomen dark brown, the basal and distal margins of the segments ringed with black. Tenth tergite well-developed, overlapping base of appendix dorsalis. Forceps-basis short, rather broad; forceps (style) two-segmented, the basal segment fully as long as the ninth abdominal segment, somewhat swollen basally and clubbed distally; the distal segment a minute, ovoid

appendage attached to the club of the basal segment; penis very short, its lobes upcurved and slightly angulated in lateral view. (Text-fig. 2.) Cerci (broken in case of type) evidently very slender, with all but a few basal segments elongate.

♂ *subimago.*—Differs from the imago in having the wings lightly infuscated and the legs straw-coloured, as well as in the usual differences of the less developed eyes, cerci and forceps.



TEXT-FIG. 2.—*Cloeön samoënse*, sp. n., holotype ♂, lateral view of genitalia. 9, 10, segments; *fb*, forceps basis; f_1, f_2, the two segments of the forceps; *p*, penis. (Appendix dorsalis and cerci broken off.)

♀ *imago.*—Considerably larger than ♂; forewing 5·7 mm. General colour yellowish brown, with eyes blackish; antennae with distal end of pedicel and whole of flagellum blackish; legs with tarsi blackish. Forewing (Text-fig. 1) hyaline, with strong brownish coloration of the whole of the costal and subcostal areas; pterostigmatic area with three cross-veins between C and Sc, and three between Sc and R_1. Abdomen with ninth sternite forming a well-developed ventral plate, apparently slightly angulated at each side and with a projecting median portion, evenly rounded off (cerci damaged in case of type).

The venational notation used in Text-fig. 1 is the New Notation as given in my *Insects of Australia and New Zealand*, p. 59 (Table), 1926.

Types and Localities :—

♂ *imago, holotype*, Upolu, Vailima, 25.x.1924.

♀ *imago, allotype*, Upolu, Apia, 13.x.1925.

♂ *subimago, paratype*, Upolu, Malololelei, 2,000 ft., xii.1925.

LIST OF TEXT-FIGURES.

Text-fig. 1. *Cloëon samoënse*, sp. n., allotype ♀, forewing. Length 5·7 mm. New Notation, the prefix *I* indicating interpolated veins; *MA*, anterior or convex portion of media; *M*, posterior or concave portion of same.

,, 2. *Cloëon samoënse*, sp. n., holotype ♂, lateral view of genitalia. 9, 10, segments; *fb*, forceps basis; f_1, f_2, the two segments of the forceps; *p*, penis. (Appendix dorsalis and cerci broken off.)

REMARQUES SUR LE *CLOËON SAMOËNSE* TILL. ET SES AFFINITÉS AVEC LES AUTRES ESPÈCES DE LA RÉGION INDO-MALAISE ET AUSTRALIENNE.

PAR J. A. LESTAGE, Directeur de l'Aquarium et du Musée de Pisciculture (Bruxelles)

L'HONORABLE Mr. P. A. Buxton, à la demande de mon excellent ami Tillyard, m' a prié de donner mon avis sur la nouvelle espèce cloéonienne qu'il a découverte dans l'île Upolu.

La présence des *Cloëon* dans ces parages n'a rien qui puisse nous étonner, au contraire. S'il est un genre ubiquiste, c'est bien celui-là, et je note, pour rappel, qu'un de ses représentants, *C. dipterum*, a essaimé jusque dans la zone néarctique.

Cloëon possède une larve qui s'accommode de toutes les eaux ; on la rencontre même souvent, et elle y vit fort bien, dans les cuves et les tonneaux destinés à recevoir l'eau servant à l'arrosage des jardins ; un milieu même salin ou saprophyte n'entrave en rien son cycle évolutif. Une telle facilité d'accommodation a permis aux *Cloëon* d'avoir une géonémie particulièrement étendue, de pouvoir prospérer et se perpétuer, beaucoup mieux que d'autres genres, là où ils existaient aux temps où des continents dressaient leur masse, et où, aujourd'hui, des îles en sont les seuls témoins.

S'il est relativement facile de suivre, pour certains groupes, leur évolution dans la Notogée, c'est chose beaucoup plus ardue de le vouloir tenter quand il s'agit de formes dépendantes du domaine potamique et, surtout, de celles dont les premiers stades se passent dans un milieu tout différent de celui du stade parfait. Si l'on admet la classification actuelle de la Notogée—régions papouasienne, australienne, polynésienne, néo-zélandaise, hawaïenne—on peut se demander à quelle souche se rattachent les *Cloëon* de Samoa.

Ce groupe de Plectoptères offre, en effet, une uniformité telle, que, en principe, le critère chromatique est le seul qui soit mis en valeur. Ailleurs, la morphologie de l'andromère offre d'excellents caractères par son polymorphisme ; ici, elle est on ne peut plus simple, et les genitalia ne montrent même que rarement un rudiment de pénis.

La taille ne saurait fournir un argument pour la théorie de l'insularisme, puisque des *Cloëon* continentaux sont aussi petits, et même davantage, que celui d'Upolu. La coloration ? On ne peut en tirer partie que comme caractère

secondaire. Les ailes ? Ce sont des organes généralisés, et rien, dans la nervation, ne peut nous aider.

Il est vrai que ce que nous connaissons de la faune des Ephéméroptères en général, et, *a fortiori*, de celle du Royaume Pacifique, est si peu de chose que ce serait fatuité de ma part d'élucider définitivement le problème de l'origine de la faune plectoptérienne de cette région.

Si nous examinons la géonémie des quelques espèces signalées dans la région indo-malaise, la plus voisine de celle de Samoa, nous voyons que :

(*a*) *Cloëon bimaculatum* Etn. existe en Chine, au Tonkin, au Bengale, à Java, à Sumatra, à Ceylan.

(*b*) *Cloëon fluviatile* Ulm. est, jusqu'à présent, une forme endémique de la Nouvelle Guinée.

(*c*) *Cloëon marginale* Hag. se trouve au Tonkin, au Bengale, à Formose, à Java, à Sumatra, à Simalur, à Ceylan, aux Philippines.

(*d*) *Cloëon pulchellum* Bks. est confiné au Bengale (Chapra).

(*e*) *Cloëon exiguum* Nav. et *C. rubellum* Nav. n'existeraient qu'aux Philippines.

(*f*) *Cloëon variegatum* Chopra a été décrit des Indes anglaises (Barkuda).

(*g*) *Cloëon virens* Klp. a été trouvé à Java et à Sumatra, puis en Australie (Kimberley).

Les données fournies par ce tableau de la répartition des *Cloëon* semblen assez suggestives. Si certaines espèces sont confinées dans une seule sous-région de la province orientale de l'Arctogée, d'autres, en revanche, habitent toutes les sous-régions de la dite province et même une partie de la région notogéenne australienne.

Ceci prouve que l'endémisme de certaines espèces pourrait bien n'être que provisoire,—on connait tant de cas déjà !—n'ayant d'autre base que notre méconnaissance du groupe en question, et sa défaveur chez les explorateurs incompétents ou trop pressés. Le peuplement s'est certainement fait de l'Ouest à l'Est, si l'on se rappelle que le semis des îles malaises faisait encore partie à une date relativement récente—la fin du Pliocène, du Continent Indo-chinois. La présence d'une espèce simultanément indo-malaise et australienne (*Cloëon virens* Klp.) prouve, une fois de plus, les connexions de la province indo-malaise avec l'Australie, régions séparées actuellement par la ligne de Weber qui isole, d'une part, les Philippines, Bornéo, Célèbes, les îles de la Sonde jusqu' à Timor

(facies faunique indien prédominant) et, d'autre part, les Moluques, Kei, Aru, Tenimber, la Nouvelle Guinée (facies faunique australien).

Il est à remarquer que, chez les formes cloéoniennes indo-malaises, et aussi chez *C. samoense*, il y a, plus souvent, coloration des ailes dans les champs costal et sous-costal ; cependant, ce n'est là qu'un caractère sexuel et, s'il est moins accusé, on le retrouve chez les formes paléarctiques, néotropiques et éthiopiennes. Ulmer * a remarqué que les articles des pattes des *Cloëon*, surtout ceux des pattes antérieures, chez les formes indo-malaises, offraient une longueur proportionnelle autre que chez les autres espèces ; les ♂ ont, aux pattes antérieures, les tibias doubles des fémurs, les tarses subégaux aux tibias, et, aux pattes postérieures, les tibias $1\frac{1}{5}$ plus longs que les fémurs, les tarses environ les $\frac{2}{3}$ des tibias.†

Il serait intéressant de savoir si ce caractère est spécial aux formes de la région indo-malaise, ou s'il existe chez des espèces connues d'ailleurs, tant insulaires que continentales.‡ Comme ce caractère est généralement négligé dans les diagnoses, on ne peut pas y attacher une valeur intrinsèque, mais il est bon de rappeler l'observation d'Ulmer pour les recherches futures.

Tillyard n'en parlant pas dans sa description du *C. samoense*, j'ai examiné les exemplaires originaux que Mr. Buxton m'a soumis avec l'autorisation de l'auteur.

La longueur proportionnelle des articles des pattes du ♂ est précisément celle qui a été signalée pour le bloc cloéonien indo-malais : pattes I à fémurs environ moitié plus courts que les tibias, à tibias subégaux aux tarses ; ces derniers ont la formule 2.3.4.5.1 ; 1 est minuscule ; 2, plus long que 3 mais plus court que 3+4 ; 4, plus long que 5 ; pattes III à fémurs $\frac{1}{5}$ plus courts que les tibias, à tarses environ $\frac{1}{3}$ de la longueur des tibias.

La formule tarsale ♂ apparente *C. samoense* à *C. marginale*, et les deux femelles ont un système de coloration identique aux ailes. Le *Cloëon* samoanien ♂ a, cependant, un caractère très spécial ; alors que tous les autres ont l'abdomen plus ou moins transparent, il offre une tonalité absolument uniforme, telle que nous la montrent les femelles et, sous ce rapport, il constitue un type particulier.

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* Ulmer, *Treubia*, vi, p. 65, 1924.

† La longueur des articles des tarses peut être également variable. Je laisse de côté ces caractères secondaires.

‡ De l'aveu d'Ulmer, ce caractère se retrouve chez *Cloëon africanum* Ulm.

Les ♀ des *C. samoense* et *C. marginale* sont à ce point semblables qu'un examen minutieux est nécessaire, surtout chez les exemplaires conservés *in sicco*. Les dessins qui caractérisent les segments abdominaux du ♂ de *C. marginale* s'estompent souvent chez la ♀ au point de disparaître sous la coloration foncière qui passe au brun foncé (jaune d'ocre pâle chez les ♀ conservées en alcool) ; cependant, à y bien regarder, on aperçoit toujours des traces de l'ornementation originale des tergites visible sous une tonalité plus rougeâtre que le fond ; ce n'est pas le cas chez la ♀ de *C. samoense*, dont les segments abdominaux sont de loin aussi foncés que ceux de la ♀ de *C. marginale*. On ne saurait, non plus, confondre les ♀ de *C. samoense* et de *C. virens ;* la coloration alaire est très différente.

Il y a lieu, encore, de mentionner les variantes que présente la nervation secondaire des ailes du ♂, variantes plus importantes que celles signalées dans la diagnose originale.

Si on se reporte à l'aile de la ♀ (Fig. 1 de Tillyard), il y a lieu de remarquer que : *deux* nervules seulement existent dans le PT ; *une* seule entre SC et R_1 située plus distalement que la dernière du PT ; *quatre* entre R_1 et R_2 : la première un peu plus basale que celle formant le commencement de la corde transversale sous-jacente,* les 2ième et 3ième comme chez la ♀, la 4ième dans l'espace compris entre la 3ième et l'apex ; la nervule de la ♀ entre R_2 et IR_2 n'existe pas chez le ♂ ; il n'y a qu'*une* seule nervule entre R_3b et IR_3b ; *une* nervule existe entre M_{1+2} et IM et *une* autre entre IM et M_{3+4}, toutes les deux naissant à la naissance de IM † ; *une* nervule relie M_{1+2} à CU_1 après leur naissance.

Evidemment, on ne saurait déclarer que cette aile et sa nervation sont caractéristiques pour le ♂ ; il faudrait un matériel plus riche pour décider de l'uniformité ou du polymorphisme de la nervation, même aux deux ailes d'un même individu, car on sait que ce n'est pas un cas exceptionnel.

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* Elle existe aussi chez la ♀ comme je viens de le constater.

† Elles sont présentes aussi chez la ♀.

SIPHONAPTERA

By P. A. Buxton, M.A., London School of Hygiene and Tropical Medicine.

The fleas obtained by us were collected from man, domestic animals and rats. None were taken on the rather numerous land birds which we collected, but it is possible that interesting fleas might be found if search were made in the nests of sea-birds (*Sula*, *Phaëton*, etc.). Of the three species collected, two at least have recently been introduced.

The following species were met with, at Apia, in 1924 and 1925.

1. Pulex irritans Linn.

On one occasion great numbers were brought to us from a house which had been shut for some months; but in general this insect was not common. *P. irritans* was also taken by Hopkins at Nukualofa, Tonga, in 1925, and by myself on Tanna, New Hebrides, in September, 1925. It is almost certain that human fleas were brought into the Pacific Islands by European shipping. Gill (*Jottings from the Pacific*, 1885) states definitely that they were absent from the islands of the Cook Group, and the atolls which lie to the north, until about 1820.

2. Xenopsylla cheopis Roths.

This insect was recorded by Doane in 1913 as occurring in Samoa. There is no doubt at all that it has recently been introduced by European shipping. We took specimens on *Mus rattus*, *M. decumanus*, and *M. exulans;* the number of fleas per rat was always low. *Mus exulans* is a small rat, found in practically all parts of Polynesia and Melanesia; it is believed that it was carried from island to island by canoes. We believe that it has no flea peculiar to it; in the Hawaiian islands, and in the New Hebrides, specimens of this rat have been searched and no fleas found upon them. (See Buxton and Hopkins, *Researches in Polynesia and Melanesia*, *No.* 1, *Memoir Series, Lond. School Hyg. and Trop. Med.*, 1927.)

3. Ctenocephalus felis Bouché.

This insect was not uncommon on dogs and cats in Apia; it was also taken in Tonga and in the New Hebrides in 1925. It may be a recent introduction, but it is quite possible that it was brought to the islands many centuries ago; it is known that the Samoans, and most other Polynesians, kept domestic dogs before the arrival of Europeans.

THYSANOPTERA

ON SOME SAMOAN AND TONGAN THYSANOPTERA, WITH SPECIAL REFERENCE TO *FICUS* GALL-CAUSERS AND THEIR INQUILINES.

By Richard S. Bagnall, F.R.S.E., F.L.S.

(With 6 Text-figures.)

I. Introduction.

The material described hereafter was collected and submitted to me by Messrs. P. A. Buxton and G. H. E. Hopkins, to whom I am indebted for the opportunity of examining a collection of more than usual interest.

It will be noticed that with one exception the species are either leaf-gall-causers on *Ficus* or inquilines thereof, and that the gall is a typical rolled leaf such as is caused by known *Ficus*-thrips. The exception is *Rhaebothrips major*, sp. n., the second described species of a genus represented by *R. lativentris* Karny, of Formosa and Australia.

In regard to the others, none are referable to the species already known from leaf galls on *Ficus*. Seven species are described, referable to three genera, one of which is new, whilst the *Ficus-Gynaikothrips*, as restricted herein, would appear to be generically distinct from other members of the genus.

II. *Ficus* gall-thrips of Samoa and Tonga, and their allies.

The genus *Gynaikothrips* of Zimmermann is represented by two species, one found in Samoa, the other in Tonga. These species are the gall-causers proper and the others undoubtedly inquilines. The recently described *Adiaphorothrips ficus* Faure, of South Africa, is referred to the same genus. All cause leaf-rolling or leaf-curling in the leaves of various species of *Ficus*.

The new genus *Dimorphothrips* is represented by two species, inquilines in *Ficus*-galls, both found in Tonga, whilst Karny's *Chelaeothrips idoliceps* recently described from a *Ficus* leaf-roll gall from Fiji is referred to the genus.

Three species, one found in Samoa and two in Tonga, belong to the genus *Euoplothrips* and are without doubt inquilines. The genus was erected by Hood in 1918 for *E. bagnalli* Hood, a North Queensland species represented by a single example collected by Mr. A. A. Girault by sweeping ; later van Leeuwen and Karny recorded it as a gall inhabitant from leaf galls on *Randia chartacea* and *Smilax australis* in New South Wales.

It is possible that more than one species is represented in these Australian records, and therefore—until more material is forthcoming—I have only attempted to diagnose the three species herein described, which in themselves present a difficult problem.

III. Other *Ficus* gall-thrips.

In the following notes I do not pretend to cover all that is known of *Ficus* gall-thrips and their inquilines.

In his " Beiträge zur Kenntnis der Gallen von Java " (*Zeitschr. für wissenschaftliche Insektenbiologie*, 1914–1916) Karny and van Leeuwen-Reijnvaan enumerate the following Thysanoptera, all of which belong to the Tubulifera, from *Ficus* leaf-galls :

1. *Haplothrips* (*inquilinus* Pr. 1921).
2. *Androthrips melastomae* (Zimm.).
3. *Mesothrips jordani* Zimm.
4. ,, *parvus* K.
5. *Gynaikothrips uzeli* Zimm.
6. *Gynaikothrips longicornis* K.
7. ,, *inquilinus* K.
8. ,, *imitans* K.
9. *Gigantothrips elegans* Zimm.
10. *Leptothrips constrictus* K.

Of these, *Gynaikothrips uzeli* and *Gigantothrips elegans* are true gall-causers of wide distribution ; *Gynaikothrips imitans* and *G. inquilinus* are described from *Ficus cuspidata* Reinw. and *Ficus* sp. respectively, whilst *Mesothrips parvus* and *Gynaikothrips longicornis* are from *F. punctata* Thunb. only. The others are found on several species of *Ficus*, whilst *Haplothrips inquilinus*, *Androthrips melastomae*, *Mesothrips jordani* and *Leptothrips constrictus* are also recorded from plants other than *Ficus*.

In 1923 (*Journ. Siam Society*, xvi, pt. 2) Karny recorded *Gynaikothrips longiceps* K. from *Ficus benjamina*. The record rests on a solitary example, and the author expresses some doubt as to its identification. In the same paper Karny suggests that his *Leptothrips constrictus* may prove to be a micromerous form of *Mesothrips jordani*, and that so-called *Androthrips melastomae*

from different host-plants may each prove to be different species, as is very likely to be the case.

In 1925 Karny (*Bull. Ent. Res.*, vol. xvi, p. 125) described a new sub-species of *Gynaikothrips uzeli* together with a single example of *Liothrips postocularis*, sp. n.; specimens were found in the curled margins of leaves of *Ficus*, sp. from East Africa. He also described his Fijian *Chelaeothrips idoliceps* referred to above, and here assigned to the new genus *Dimorphothrips*.

In the same year Faure described his *Adiaphorothrips ficus*, of South Africa, which belongs to the genus *Gynaikothrips*, whilst Watson (*Synopsis and Catalog of the Thysanoptera of North America*, 1923) described *Sedulothrips hubbelli* from *Ficus*, sp.

From these remarks it will be seen that the material from Samoa and Tonga, in so largely adding to our knowledge of the subject, is of considerable interest and importance.

IV. Geographical Distribution.

The following list of the known species of the four genera represented in this collection, with their distribution, is informative.

Genus *Gynaikothrips* Zimm.

Species causing leaf-galls on *Ficus*, spp.

G. hystrix Bagn.	Tonga.
G. hopkinsi Bagn.	Samoa.
G. australis Bagn.	Australia (N.S.W.).
G. ficus (Faure).	South Africa.
G. uzeli Zimm.	Indo-Malaya, N. America, Mediterranean, Canaries, etc.

Note.—The last-named species requires study, as do also *G. longicornis*, *G. inquilinus* and *G. imitans*, which probably fall into this genus as here restricted.

Genus *Dimorphothrips* Bagn.

Inhabitants of *Ficus* leaf-galls.

D. microchaetus Bagn.	Tonga.
D. solitus Bagn.	Tonga.
D. idoliceps (K.).	Fiji.

Genus *Rhaebothrips* Karny.

R. lativentris K. *f. aptera.*	Formosa.
R. ,, *f. macroptera.*	Australia.
R. major Bagn.	Samoa.

Genus *Euoplothrips* Hood.

Inhabitants of leaf-galls.

E. bagnalli Hood.	N. Australia.
E. buxtoni Bagn.	Tonga.
E. incognitus Bagn.	Tonga.
E. uncinatus Bagn.	Samoa.

Thus, with the exception of *Dimorphothrips*, which is purely Pacific in its distribution, all the genera are represented in Australia, but although the Indo-Malayan fig-thrips are well known, only the genus *Gynaikothrips* is represented in Indo-Malaya proper.

V. Teratology and an Established Specific Character.

In my Memoir on the Thysanoptera of the Seychelles (*Ann. Mag. Nat. Hist.* (9), vii, pp. 257–293, 1921) I noted a teratological condition in the pronotal chaetotaxy of an Idolothripid (*Dicaiothrips hystrix* Bagn.), wherein the outer postero-marginal bristle is duplicated, the inner bristle replacing the usual micro-setae. The same condition exists in *Gynaikothrips hystrix* described herein, and is actually fixed and of specific value.

VI. Description of the Galls.

Both edges of the leaf are curled upwards and inwards in an unbroken roll towards the midrib (accompanied by a more or less strong curvature), thus forming two long tubes in which the insects are to be found.

VII. Descriptions of *Ficus*-affecting Genera and Species.

Genus Dimorphothrips, nov.

♂. Head long, more than 1·5 times as long as broad with cheeks, which are 2·0 times as long as the eyes and evenly arcuate ; vertex conically produced, bearing the anterior ocellus forwardly directed at the apex ; posterior ocelli well forward, but below a line drawn across the anterior margin of the eyes ; equidistant or having the anterior ocellus slightly more apart from the posterior

ocelli (in *D. idoliceps*). Post-ocular and post-ocellar setae minute. Mouth-cone short and bluntly rounded. Antenna about 1·3 times as long as the head, somewhat stout; first joint large, elongate and cylindrical, intermediate joints clavate and the last two joints broadly united.

Pronotum transverse, decidedly shorter than the head; bristle at each posterior angle stout, prominent; the inner postero-angular pair short and all other pronotal setae minute. Fore-legs stout, the tibia only 2·0 times as long as broad at apex, fore-tarsus large, with a large stout tooth; hind and intermediate legs longer and somewhat stout. Wings heavy, not constricted near middle, fore-wings with a long series of duplicated cilia. Abdomen somewhat elongated, narrower than the pterothorax; segments, more noticeably the intermediate ones, laterally spinose. Bristles at posterior angles of segments short and spine-like as in *Gigantothrips*, but with segment 9 either similarly short and spine-like in one species or with the normal long bristles in another, or in yet another species with long abnormally stout bristles. In the first and the last the tube is slightly shorter than the head, whilst in the latter—the species with the normal long bristles on the ninth segment—it is decidedly longer than the head. The tube provides a character that may be generic in that, of the longer terminal hairs the one on each side of the minute central setae is distinctly shorter than the others.

The genus is peculiar in the form of the head, the short broad fore-tibiae, the chaetotaxy of the pronotum, the chaetotaxy of the abdomen, including the spinose sides of the segments, and especially the dimorphism exhibited in the chaetotaxy of the ninth abdominal segment which suggests the generic name. The characteristic terminal hairs of the tube described above would also appear to be distinctive.

From *Gigantothrips* the genus may be distinguished by the form of head, the stout fore-tibiae and the heavily armed fore-tarsus, and the stout antennae. It resembles *Coryphothrips* in some respects, such as in the conical production of the head and the chaetotaxy of the hind margin of the pronotum, but in that genus the antennae are set well below the vertex, the anterior ocellus is situated below the conical production, the antennae are long and slender, the fore-legs normally long, not stout, and the tarsi unarmed; the chaetotaxy of the abdomen is normal, whilst the fore-wings are devoid of duplicated cilia. Karny's *Chelaeothrips idoliceps* is referable to this genus.

The specimens described below are in both cases almost certainly ♂♂; in

D. solitus there is no doubt whatever as regards the sex, but in *D. microchaetus* it is impossible to examine the structure of the base of the tube. In my opinion, however, the inner spine at each posterior angle of abdominal segment 9 represents the pair that is peculiar to the ♂, whilst the specimens of *D. idoliceps* (K.) that I have had the opportunity of examining also appear to be males.

Genotype *Dimorphothrips microchaetus*.

Table of Species.

1. Antennal joints 3–8 yellow; conical production of head longer; tube shorter than head; bristles of 9th abdominal segment long, abnormally stout. Hab. Fiji	*D. idoliceps* (Karny, 1925).
Antennal coloration otherwise; conical production of head shorter; chaetotaxy of 9th abdominal segment otherwise. Hab. Tonga	2.
2. Size larger, c. 3·0 mm. Tube longer, 1·4 times as long as the head and having the terminal hairs 0·5 the length of the tube. Bristles of 9th abdominal segment reduced as in the preceding segments, and only about 0·12 as long as the tube	*D. microchaetus*, sp. n.
Size smaller, c. 2·4 mm. Tube shorter, 0·9 the length of the head with the terminal hairs 0·7 the length of the tube. Bristles of 9th abdominal segment normal, the outer pair being about 0·9 the length of the tube	*D. solitus*, sp. n.

1. Dimorphothrips microchaetus, sp. n. (Text-fig. 1).

♂. Length c. 3·0 mm.

With the characters of the genus.

Dark chestnut brown, fore tibiae and all tarsi yellow shaded with light grey-brown; antennal joint 1 concolorous with head, 2 brown, yellowish-brown apically; 7 and 8 brown with base of 7 inclined to be somewhat paler; 3 yellow, 4 a deeper yellow with apical part (about 0·4) shaded with pale grey-brown, 5 similar, but with apical half of a deeper brown shade and 6 brownish-yellow, with apical half darkish brown. Wings brown and cilia fumate.

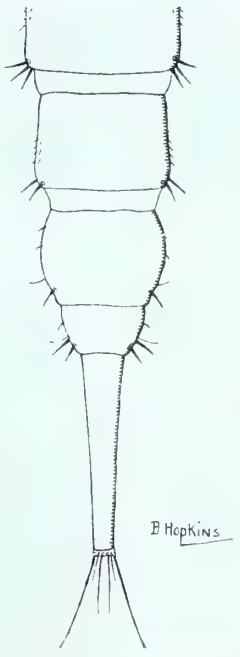
Head not quite 0·6 as broad as long, and 1·6 times as long as the pronotum. Antenna with joint 1 unusually long, joints 3–5 clavate, with the relative lengths (and breadths) of segments approximately as follows: 54(46); 54(43); 81(41); 78(46); 78(45); 68(42); 56(32); 32(18) μ.

Pronotum about 1·7 times as broad near base as long; outer postero-marginal (postero-angular) bristle stout, 98 μ long or nearly 0·5 the median

length of pronotum, and inner pair apparently about 0·5 the length of the outer. Fore-coxal seta only about 40 μ in length. Fore-wings with 21 duplicated cilia. Sides of abdominal segments 3–6 very noticeably spinose; bristles on posterior angles of abdominal segments 50 to 68 μ in length, the outer pair on segment 9 being 63 μ long and longer than the adjacent spine characteristic of the ♂. Tube 1·4 times the length of the head, with the terminal hairs 0·5 the length of the tube, except the inmost pair, which are a little more than 0·5 as long as the others.

Length (and breadth) of head, pronotum and pterothorax 360(205); 210(350); and 525(472) μ respectively; length of femora and tibiae I, 283(156); 162(80); II, 256(108); 216(75); and III, 338(128); 297(95) μ. Length of tube 500, breadth at base 104 and at apex 47 μ.

This species is sharply distinguished from the following by its larger size, the very long tube, and the absence of long bristles on the 9th abdominal segment.



Text-fig. 1.—*Dimorphothrips microchaetus*, sp. n. Posterior abdominal segments and tube.

Tonga: Nukualofa, 1 ♂, 20.ii.1925, in galls of *Gynaikothrips hopkinsi* on *Ficus* leaves.

2. Dimorphothrips solitus, sp. n. (Text-fig. 2.)

♂. Length about 2·4 mm.

Colour and general form as in *D. microchaetus*.

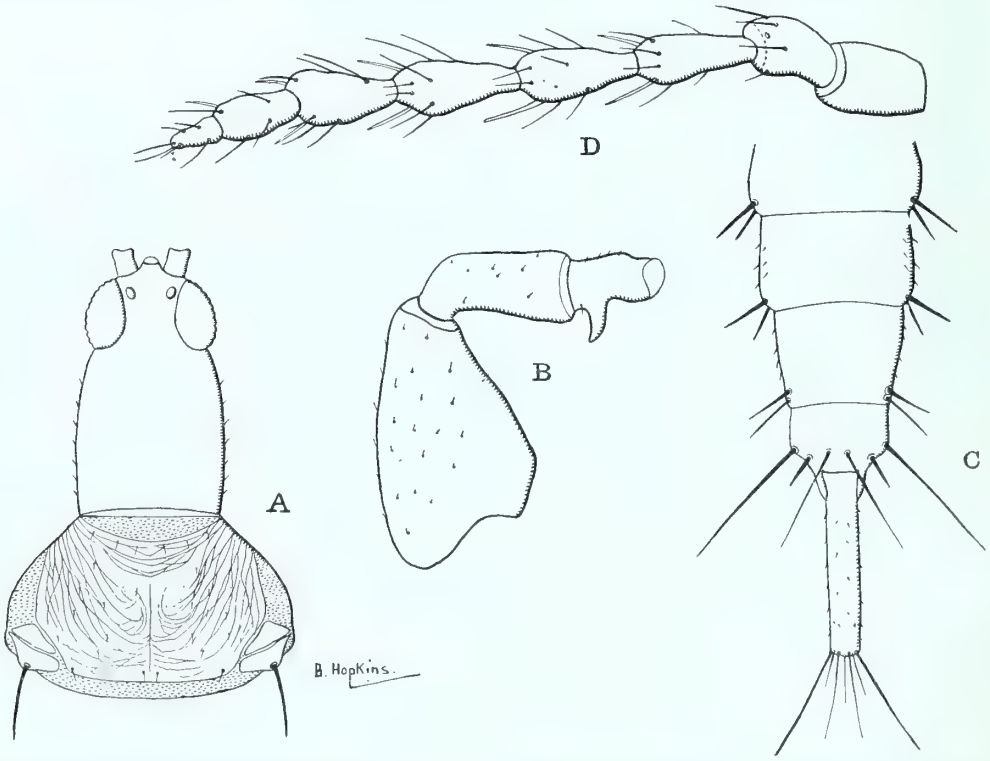
Pronotum 1·6 times as broad as long, bristle at hind angle 108 μ long, or a little more than 0·5 the length of the pronotum, and the inner only 32 μ or about 0·3 the length of the outer. Fore-coxal seta 32 μ long. Fore-wings with 21 duplicated cilia as in *D. microchaetus*.

Abdomen with sides of segments 3–7 most noticeably spinose, bristles at posterior angles somewhat longer than in *microchaetus* c. 60–80 μ, and those on segment 9 normal, the outer pair being nearly 0·9 the length of the tube, with the inner adjacent spine (characteristic of the ♂) apparently slightly longer and stouter than in *D. microchaetus*. Tube 0·9 the length of the head, with the

terminal bristles 0·7 its length, except the inmost pair, which are 0·5 as long as the others.

The lengths (and breadths) of the antennal segments 3–8 are approximately as follows: 73(35); 73(40); 70(38); 60(35); 52(30); 32(16) μ.

Length (and breadth) of head, pronotum and pterothorax 337(190): 202(324) and 460(418) μ respectively; length (and breadth) of femora and



Text-fig. 2.—*Dimorphothrips solitus*, sp. n. A, head and thorax; B, fore-leg; C, posterior abdominal segments and tube; D, antenna.

tibiae, I, 270(142); 148(68); II, c. 200(74); 190(62); and III, 310(100); 270(68) μ. Length of tube 310, breadth at base 81 and at apex 40 μ.

Tonga: Nukualofa, 1 ♂, 20.ii.1925, in galls of *Gynaikothrips hopkinsi* on *Ficus* leaves.

Genus Gynaikothrips Zimmermann, s. str.

Head longer than broad, and longer than the pronotum; vertex conically produced, bearing the anterior ocellus at apex; constricted behind eyes, where the cheek is inclined to be dentiform before constriction; mouth-cone reaching

only about 0·5 across prosternum, bluntly rounded ; antenna 8-jointed, normal. *Two pairs of postocular bristles*, and a pair of bristles immediately behind the posterior ocelli ; *cheeks either entirely spinulose, or with a few scattered setae.*

Pronotal bristles well-developed, outer postero-angular with a subsidiary bristle either much smaller or (as in *G. hystrix*) subequal in length.

Fore-wings broad, not constricted near middle and with a series of duplicated cilia. Legs normal, fore-tarsus with a small tooth in the ♀ and a longer, stronger one in the ♂.

Tube long, either a little shorter, or a little longer, than the head.

Species cause leaf-curling and rolling on *Ficus* spp.

Since *Gynaikothrips uzeli* is the genotype, its name must stand, and it will be necessary to remove to another genus (or to other genera) most of the species described by Karny.

This section of the genus is characterised by the *two* pairs of postocular bristles and the spinulose cheeks. The chaetotaxy reaches its maximum in *G. hystrix*, in which the outer postero-marginal (postero-angular) pronotal bristle is duplicated, so that a condition that I have described as teratological in a Seychelles insect (*Dicaiothrips hystrix* Bagn.) is actually fixed, and of specific importance, in *Gynaikothrips hystrix*.

Faure's *Adiaphorothrips ficus*, of South Africa, belongs to this genus.

Table of Species.

The following table deals only with the species herein discussed ; the smaller *G. uzeli* is already well-known, and the three fig-species, *G. longicornis*, *G. inquilinus* and *G. imitans* K., will almost certainly be found to fall into the section.

1. Antenna stouter, third joint 2·0 to 2·5 times as long as broad, with joints 3–8 pale ; post-oculars long, 1·2 to 1·6 times as long as eye ; tube nearly as long as head . . . . . 2.

   Antenna more slender, 1·6 times as long as head, third joint 2·8 to 3·2 times as long as broad, with most of joint 3 and basal halves of 4–6 pale yellow ; post-oculars minute. Cheeks and outer margins of fore-femora evenly and minutely spinulose. Tube 0·94 of length of head, with terminal hairs about 0·5 as long as tube. Hab. South Africa . . . . . *G. ficus* (Faure).

2. Cheeks with angulation at constriction before eye weak, genal setae many, scattered, long (up to 45 μ in length). Post-ocular bristles somewhat, and post-ocellars distinctly, longer. Pronotal bristles longer, postero-angular bristle duplicated by abnormal development of adjacent inner microseta, which is subequal in length. Fore-coxal seta long, 90 to 100 μ. Outer margins of femora closely and strongly setose, longest setae in

fore-femora c. 120 μ in length. Abdominal bristles and terminal hairs longer. Hab. Tonga . . . . . *G. hystrix*, sp n.

Cheeks with angulation at constriction before eye markedly dentiform; almost entirely devoid of genal setae except two short pairs (18 to 24 μ long) behind constriction. Post-ocular bristles somewhat, and post-ocellars distinctly, shorter. Pronotal bristles not so long, inner micro-seta adjacent to postero-angular usually normally small, rarely developed, and at its maximum 0·7 of length of that bristle. Fore-coxal seta shorter, c. 40 μ long. Outer margin of fore-femur with only two pairs of prominent bristles, near middle and before apex, the former the longer, c. 70 μ in length. Abdominal bristles and terminal hairs not so long. Hab. Samoa . . . . . *G. hopkinsi*, sp. n.

3. Gynaikothrips hystrix, sp. n. (Text-fig. 3).

♀. Length 2·9 to 3·2 mm.

Colour dark chestnut-brown, fore-tibia and tarsus yellow, shaded with brown, intermediate and hind tarsi yellowish-brown. Antenna with joint 1 concolorous with head, 2 lighter brown and paler distally, 3 pale yellow, 4 and 5 also pale yellow, but somewhat deeper in colour distally, 6 yellow, lightly shaded with brown in distal half, and 7 and 8 yellowish-brown.

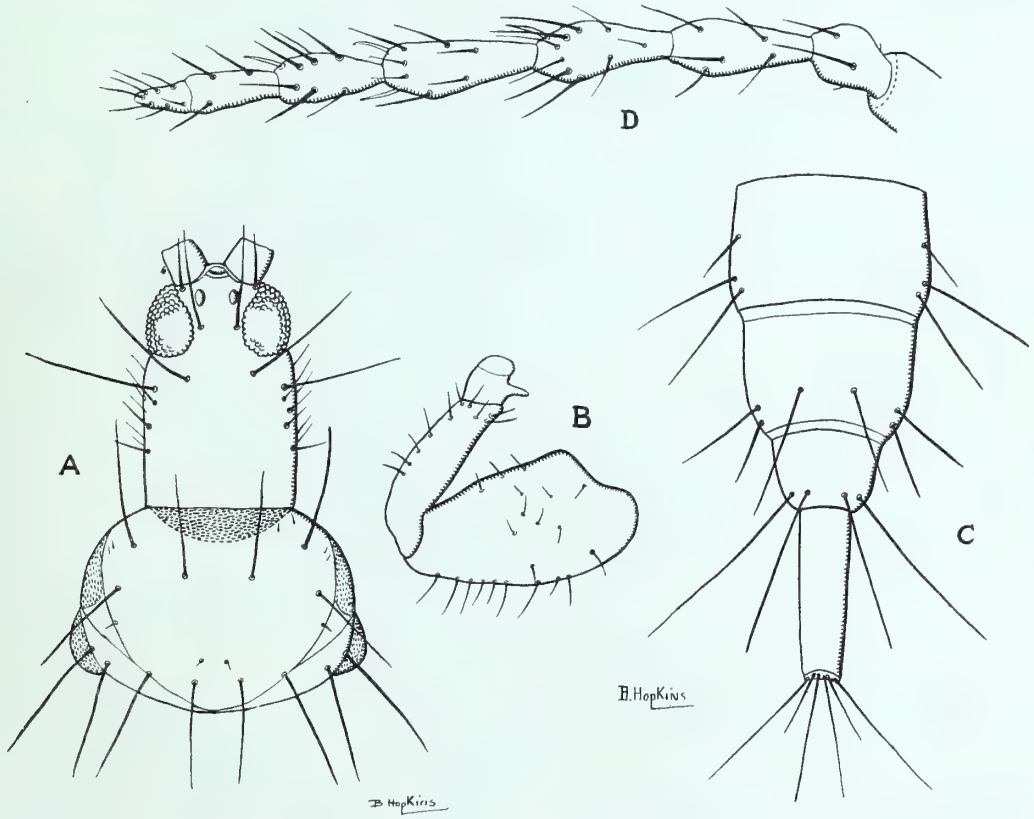
(The above description of colour applies to a fully coloured individual, but most of those before me have the body colour much lighter, due, I think, to the medium in which they were collected.)

Head not quite 1·5 times as long as broad; angle at constriction of head behind eyes not strong. Postoculars long, 190 to 220 μ, inner pair on a line with inner margins of eyes, separated by about 81 μ and on a higher plane than the outer pair, which are separated by 190 μ; post-ocellar pair also long (120 μ), nearly reaching to the apex of the first antennal joint. Genal setae scattered, long, the longer (near the eyes) up to 45 μ in length. Antenna 1·8 times as long as the head, with joint 1 rather long, 3 to 6 claviform, and 7 and 8 closely united. Relative lengths (and breadths) of antennal joints approximately as follows: 68(52); 60(46); 110(42); 100(49); 100(47); 84(42); 72(33); 46(20) μ.

Pronotum transverse, all bristles present and abnormally long, the outer postero-marginal (or angular) bristle duplicated by the abnormal development of the usual inner micro-setae, so that there are 2 subequal outer bristles situated close together in addition to an inner pair. Outer postero-marginal pairs (c. 240 μ) longer than the median length of pronotum, and than the inner pair

(c. 200 μ); mid-laterals and outer and inner antero-marginals approximately 140 to 174 μ in length. Coxal seta long (c. 90 to 100 μ). Outer margin of femora strongly and closely setose, the setae on the fore-femur, which are the longest, about 120 μ in length. Fore-wings with 18 to 21 duplicated cilia.

Abdomen elongate; tube 0·9 or more the length of the head, gradually narrowing to apex, where it is a little more than 0·5 as broad as at base; terminal



Text-fig. 3.—*Gynaikothrips hystrix*, sp. n. A, head and thorax; B, fore-leg; C, posterior abdominal segments and tube; D, antenna.

hairs as long as the tube. Abdominal bristles long, as long as or longer than the segments bearing them, those on 9 as long as or slightly longer than the tube.

Length (and breadth) of head, pronotum and pterothorax 352(242); 230(440) and 580(607) μ respectively; length (and breadth near middle) of fore-wing 1400(122) μ; length (and breadth) of fore-femur 344(175) μ; width of abdomen 486 μ. Length of tube 324, width near base 103, and at apex 54 μ.

♂ smaller and more slender than the ♀, with the tube about 0·85 the length of the head. Tube with basal emargination deep. Abdominal bristles not so strong or long as in the ♀, those on segment 9 less than the length of the tube. The pair of spines on segment 9 characteristic of the ♂ long, about 67 μ.

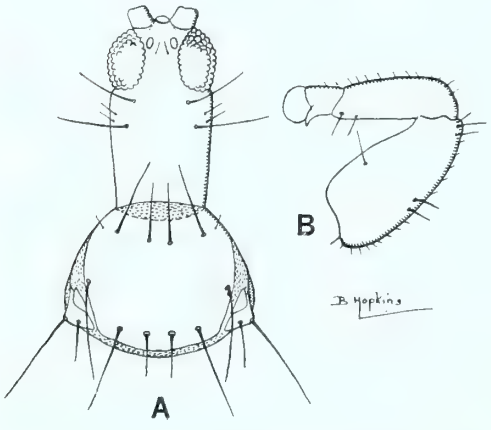
Tonga: Nukualofa, both sexes (but ♂♂ preponderating), and larvae in rolled margins of *Ficus* leaves, 20.ii.1925.

4. Gynaikothrips hopkinsi, sp. n. (Text-fig. 4).

♀. Length about 2·8 to 3·0 mm.

Colour as in *G. hystrix*, with the fore-tibiae and tarsi darker than in that species.

This species is nearly allied to *G. hystrix*, from which it differs chiefly in its chaetotaxy. The cheeks have a decidedly dentiform angulation at the constriction behind the eyes, and are almost entirely devoid of setae except 2 short ones (18 to 24 μ in length) behind the constriction; postoculars somewhat shorter, and the post-ocellar bristles markedly shorter than in *G. hystrix*. Second antennal joint with an erect sensory seta on the inner side at apex, markedly stouter and longer than in *G. hystrix* (48 to 54 μ as compared with 36 to 40 μ).



TEXT-FIG. 4.—*Gynaikothrips hopkinsi*, sp. n. A, head and thorax; B, fore-leg.

Antenna 1·75 times as long as the head; joints somewhat shorter and stouter than in *G. hystrix*, the relative lengths (and breadths) of 3 to 8 being approximately as follows: 100(46); 93(53); 92(50); 76(43); 68(35); 52(22) μ.

Pronotum with the bristles somewhat shorter than in *G. hystrix*; of those at posterior angles, the inner micro-seta is usually normally small, but more rarely well-developed, and at its maximum about 0·7 the length of that bristle. The fore-coxal seta shorter than in *G. hystrix*, only about 40 μ as opposed to 90 to 100 μ, and fore-femur along the outer margin with only two pairs of prominent setae, one, the longer (c. 70 μ), near middle, and the other before apex, the rest being minute (c. 17 μ). Micro-setae on outer margin of inter-

mediate and posterior femora longer and stronger. Fore-wings with 18 duplicated cilia.

Abdomen with long stout bristles, though not so long as in *G. hystrix;* those on segment 9 about 0·9 the length of the tube. Tube nearly as long as the head, with the terminal hairs 0·8 to 0·85 as long as the tube.

Length (and breadth) of head, pronotum and pterothorax, 336(236); 209(405); and 540(512) μ respectively; length (and breadth near middle) of fore-wing 1282(120) μ; length (and breadth) of fore-femur 324(155) μ. Width of abdomen 460 μ. Length of tube 324, width near base 89 and at apex 41 μ.

♂. The male differs from the ♀ in the same manner as in *G. hystrix*, and the pair of spines on segment 9 are about as long, say c. 60 μ.

Upolu: Apia, curling the leaves of *Ficus*, both sexes (with ♂♂ preponderating) and larvae, 25.v.1925.

Genus Euoplothrips Hood.

Mem. Queensland Mus., vi, p. 140, 1918.

In describing this strongly characterised genus, Hood stated that "it is without doubt a gall-making genus." He described the genotype, *Euoplothrips bagnalli*, from a single ♀ taken by Mr. A. A. Girault, on May 30, 1912, by sweeping in jungle at Nelson, North Queensland. In 1924, W. Docters van Leeuwen and H. H. Karny published a paper on "Two New Thrips-galls and their inhabitants, from New South Wales" (*Proc. Linn. Soc. N.S.W.*, xlix, Part 3, 1924), in which leaf-galls on *Randia chartacea* F. v. M., and *Smilax australis* R. Br. are described. Only two examples of *Euoplothrips bagnalli* were found in the former gall, but in the latter both the Malayan *Cryptothrips* (?) *intorquens* K. (previously known from two other species of *Smilax*), and *E. bagnalli* were present, and, in view of the present records, it would be safer to regard members of the genus *Euoplothrips* as inquilines rather than as gall-causers.

In the following descriptions (of females), *E. buxtoni*, sp. n., and *E. incognitus*, sp. n., are curiously analogous with the male forms recorded by Karny as macromerous and micromerous *E. bagnalli* of Hood, but in these forms from Tonga, which I can only regard as species, there are other differences apart from size and structure of the fore-legs, such as in the comparative length of the head and in the antennal joints, sub-basal bristles of the fore-wing, etc.

I have felt it wise, therefore, to ignore Karny's forms (since they may

require further study when the genus is better known), and to base my comparisons upon Hood's description alone.

From his description it will be seen that *E. bagnalli* differs from the species here described in its small size, short antennal joints 3 and 4, and in the sub-equal sub-basal bristles of the fore-wing, and from *E. buxtoni* and *E. incognitus* in its shorter head.

Table of Species (Females).

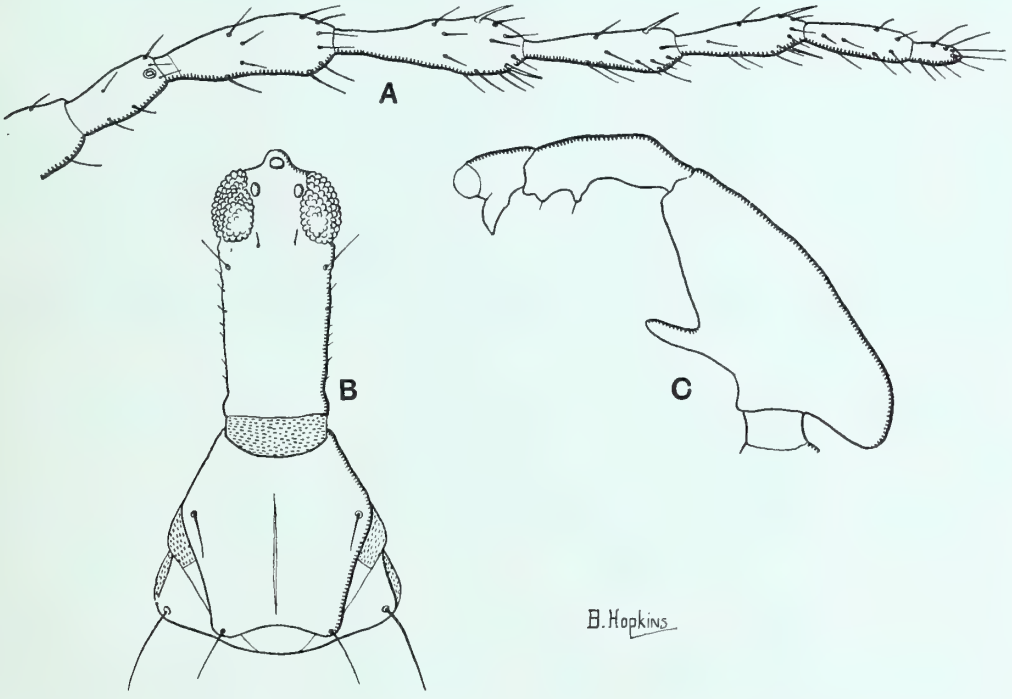
1. Size smaller (2·16 mm.); antennal joints 3 and 4 not more than 2·0 times as long as broad; sub-basal bristles of fore-wing sub-equal in length. Hab. Queensland	*E. bagnalli* Hood.
Size larger (3·3 to 4·0 mm.); antennal joints 3 and 4 more than 2·0 times as long as broad; sub-basal bristles of wings otherwise. Hab. Samoa and Tonga	2.
2. Head 1·6 times as long as broad, and tube 0·8 as long as head; basal production of fore-femur incurved and hook-like, with corresponding recess in fore-coxa; antenna more slender, having joint 3 shorter as compared with 4, and joint 7 longer and more slender, nearly 3·5 times as long as broad; sub-basal bristles of fore-wing unequally spaced and unequal in length. Hab. Samoa	*E. uncinatus*, sp. n.
Head longer and tube comparatively shorter; fore-femur basally normal; antenna stouter, joint 3 comparatively longer and 7 shorter; sub-basal bristles of fore-wing equidistant, 1 only 0·5 (or less) the length of 2 and 3, which are sub-equal. Hab. Tonga	3.
3. Size large (3·7 to 4·0 mm.); head 2·0 times as long as broad; antennal joint 3 more than 2·4 times, and 7 about 2·55 times as long as broad. Fore-legs larger and armature stronger (see figs.); 15 to 20 duplicated cilia in fore-wing	*E. buxtoni*, sp. n.
Size smaller (3·3 mm.); head 1·8 times as long as broad; antennal joint 3 only 2·2 times, and 7 about 2·9 times as long as broad. Fore-legs smaller and armature weaker; 10 to 12 duplicated cilia in fore-wing	*E. incognitus*, sp. n.

5. Euoplothrips buxtoni, sp. n. (Text-fig. 5).

♂. Length 3·7 to 4·0 mm.

Dark chestnut brown, fore tibiae and tarsi yellow, inner margin of fore femur shaded to brownish-yellow with the spine-like production yellow, hind and intermediate trochanters and tarsi light brown. Antennae with joints 1 and 6 to 8 of a uniform dark brown, 5 not so dark, 3 and 4 again somewhat paler and somewhat mottled, especially basally and marginally, with yellowish-brown; 2 apically and towards outer margin shading to yellowish-brown. Wings

brownish-yellow, the upper with a dark brown longitudinal line near hind margin, having the space below paler than the rest of the wing; hind wings with a similar, but more nearly median, dark longitudinal line. Postocular, prothoracic and lateral abdominal bristles pale; wing cilia, dorsal abdominal bristles and terminal hairs of tube fumate.



Text-fig. 5.—*Euoplothrips buxtoni*, sp. n. A, antenna; B, head and thorax; C, fore-leg.

Head long, approximately twice as long (to a line across eyes) as broad across eyes, and about 2·7 times as long as broad near base, where it is 0·7 as broad as across eyes. Cheeks regularly setose, the setae springing from raised bases, sharp pointed, and from 20 to 25 μ in length; post-oculars somewhat long (130 to 150 μ), almost as long as an eye, which latter occupies dorsally 0·3 the length of the head; ocelli equidistant, the anterior ocellus overhanging and on a line with the base of the antennae; posterior pair situated close to the inner margins of eyes on a line drawn across their distal third. Antenna about 1·6 times as long as the head, much as in the genus *Mesothrips;* joint 1 stout but constricted in the distal third, 2 long compared to its breadth, which at apex is much less than the greatest breadth of 3; 3–4 clavate, and distinctly

broader than the following: 5 and 6 elongate and less strongly claviform, 7 elongate and inclined to be claviform more than fusiform, and 8 broad at base.

The relative lengths (and breadths) of antennal segments 3 to 8 are approximately as follows: 146(60); 149(60); 138(46); 108(38); 84(33); and 48(19) μ. Mouth cone very short, broadly rounded, and shorter than its basal breadth.

Pronotum widening towards middle, then roundly straightened and again broadened basally, where the sides are arcuate and the posterior margin gently curved; 1·2 times as broad before base as medianly long. Bristle at hind angle pointed, somewhat curved and about 0·32 the length of the pronotum. Inner postero-marginal and mid-lateral pair not so long and apparently more slender, the latter being about 0·7 the length of the postero-angular; antero-marginal pairs more minute. Dorsal plate shield-like and having a well-defined median line.

Fore-legs with the coxa elongated, dorsally flattened and the end truncate, the hind angle rounded and the fore angle acute; the coxal seta situated near the hind angle, c. 100 μ long and inclined to be curved.

Fore-femur 1·25 times as long as the head, and 0·5 as broad near middle (excluding the spine-like production) as long; posterior margin (from the trochanter) straight, but ending in a somewhat produced and rounded angle, though not to anything like the extent seen in *E. uncinatus*, sp. n. (p. 73); outer margin gently rounded; inner margin emarginate near base, whence the spine-like prolongation is gently curved upwards and somewhat inwards, after which the margin is straight, narrowing to tip. Tibia stout, the median prolongation stout at base, then broadly thumb-like and about 0·6 as long as width of tibia at the narrowest between the armature; apical prolongation projecting in a sharp angular tooth 0·3 as long as the width above defined. Tarsal tooth beak-like and long, as long as or longer than the width of the tarsus (excluding tooth), and more than 2·0 as long as the width near base. Hind and intermediate legs stout, femora appearing inflated.

Fore-wings fourteen times as long as broad, with 15–15 duplicated cilia in one specimen and 19–20 in the type. Sub-basal bristles consisting of 1 short erect and 2 longer, somewhat curved and relatively more slender ones, the short one being 70 μ in length, and only 0·5 as long as the others; they are separated from each other by 54 μ and equidistant.

Abdomen slender, narrower than pterothorax at segment 2 where it is broadest; tube 0·62 the length of the head, and about 0·3 as broad at base as long; lateral bristles long, those on segment 9 nearly as long as the tube; terminal hairs about 0·85 the length of the tube.

Length of head and breadth across eyes and near base, 550, 280 and 200 μ respectively; length of post-ocular bristle 130 μ; total length of antenna 850 μ; length (and breadth) of pronotum, pterothorax and fore-wing 350(420), 600(520), and 1750(128) μ respectively. Length (and breadth) of femora and tibiae, I, 700(350); 350(95); II, 470(200); 326(95), and III, 540(240); 420(102) μ respectively. Breadth of abdomen 540 μ; length of tube and breadth at base and apex 350, 110 and 58 μ respectively.

Apart from being nearly twice the size, and somewhat different in colour, this species differs from *E. bagnalli*, as described by Hood, in its stronger legs, the larger series of duplicated cilia in the fore-wing, and the form of the sub-basal bristles, and more particularly in the much longer head, as compared with breadth across eyes, and apparently the more regularly and closely spinulose cheeks. The postocular and pronotal setae are blunt in *E. bagnalli*, and the former are much shorter than in *E. buxtoni*. In *E. bagnalli* the third and fourth antennal joints are scarcely twice as long as broad, whereas in *E. buxtoni* they are practically 2·5 times as long as broad; Karny figures the fore-legs of what he calls the macromerous and micromerous males of *E. bagnalli*, the former of which closely agrees with the fore-leg in the ♀ of *E. buxtoni*.

Tonga: Nukualofa, 2 ♀♀ in galls of *Gynaikothrips hystrix* Bagn., 20.ii.1925.

6. Euoplothrips incognitus, sp. n. (Text-fig. 6, C).

♀. Length about 3·3.

Colour much as in *E. buxtoni*, but fore-femora not yellowish at inner margin, and the spine-like projection yellowish-brown. Head only 1·8 times as long as broad across eyes, and 2·4 times as long as broad near base, where it is about 0·75 as broad as across eyes. Relative length of eye to head, and of post-oculars to eye as in *E. buxtoni*. Antennae also 1·6 times as long as head, but segment 7 relatively much longer as compared with 6 (81 : 92) than in *E. buxtoni* (84 : 108), and more slender, being 2·9 as long as broad, whilst 3 is stouter as compared with its length, being only 2·2 times as long as broad (as compared with more than 2·4 in *E. buxtoni*).

The relative lengths (and breadths) of the antennae of the various species may be tabulated as follows :

E. bagnalli Hood .	μ 83(46) ;	89(45) ;	81(36) ;	69(27) ;	57(22) ;	40(12).
E. buxtoni Bagn. .	μ 146(60) ;	149(60) ;	138(46) ;	108(38) ;	84(33) ;	48(19).
E. incognitus, sp. n. .	μ 125(54) ;	127(53) ;	119(45) ;	92(40) ;	81(28) ;	46(15).
E. uncinatus, sp. n. .	μ 120(54) ;	130(51) ;	122(42) ;	98(34) ;	90(26) ;	48(15).

The duplicated cilia in the fore-wing number 12, whilst the sub-basal bristles are equidistant ; the first is erect and about 0·45 the length of the following bristles which are curved and subequal in length (54 : 122 : 122 μ).

Fore-legs normal, much as described in *E. bagnalli*, and of the type regarded by Karny as *micromerous* (see Text-figs.), differing in their smaller size, the shorter and more erect femoral spine, and the weaker armature of the tibia, the distal tooth of which does not form the contour of the upper margin.

Tube 0·67 as long as head, and 0·32 as broad at base as long. Bristles of abdominal segment 9 nearly as long as the tube, and the terminal hairs about or a little more than 0·8 as long.

Length of head and breadth across eyes and at base 445, 245, and 182 μ respectively ; length of eye and of post-ocular bristle 135 and 122 μ respectively ; length (and breadth) of pronotum and pterothorax 305(405) and 634(555) and length of postero-angular bristle 125 μ. Breadth of abdomen 460 μ ; length of tube and breadth at base and at apex, 300, 94 and 50 μ respectively. Length and breadth of femora and tibiae approximately I, 500(180) ; 243(74), II, 350(128) ; 284(68), and III, 445(148) ; 350(74) μ.

♂ very closely resembling the ♀ ; in one specimen one wing has only 10 duplicated cilia and the other 12. The characteristic spine of the 9th abdominal segment is 54 μ in length.

Tonga : Nukualofa, 1 ♀ and 2 ♂♂ in galls of *Gynaikothrips hystrix* Bagn., 20.ii.1925.

7. Euoplothrips uncinatus, sp. n. (Text-fig. 6, A, B, D).

♀. Length about 3·5 mm.

This species differs from *E. buxtoni* in its somewhat smaller size, distinctly shorter head, which is only 1·6 times as long as broad across eyes, and short post-oculars. In colour the fore-femora are dark, but inclined to be lighter at the extreme apex and near the trochanters, while the spine-like production is also yellow; the fore-tibia is more or less yellow to yellowish-brown, with the outer margin dark brown, while the intermediate and hind tibiae are yellowish at the knees. The antennae are more slender, being 1·28 times as long as the head, and are lighter in colour, only joint 1 being concolorous with the head; joint 3 is pale yellowish-white in the basal half, joints 4 and 5 are also pale in the basal two-fifths, this pale area being ringed by a brownish band, while 6 is generally paler in the basal third, sometimes being ornamented with a darker ring; the last two joints are much more slender, whilst 7 is longer than in *E. buxtoni*, nearly as long as 6, and 3·5 times as long as broad, as compared with little more than 2·5 times as long as broad in *E. buxtoni*.

The fore-legs are very characteristic; the coxa is different in form, and appears to be strongly curved from the trochanter, so that the upper part is raised over the hook-like production of the femur; the femur is much as in *E. buxtoni*, except that the spine-like production is stouter, somewhat longer and more forwardly directed, while posteriorly the femur is inwardly recurved and narrowed into a hook-like end (which suggests the name), the coxa being correspondingly recessed (as described above) for ease of movement.

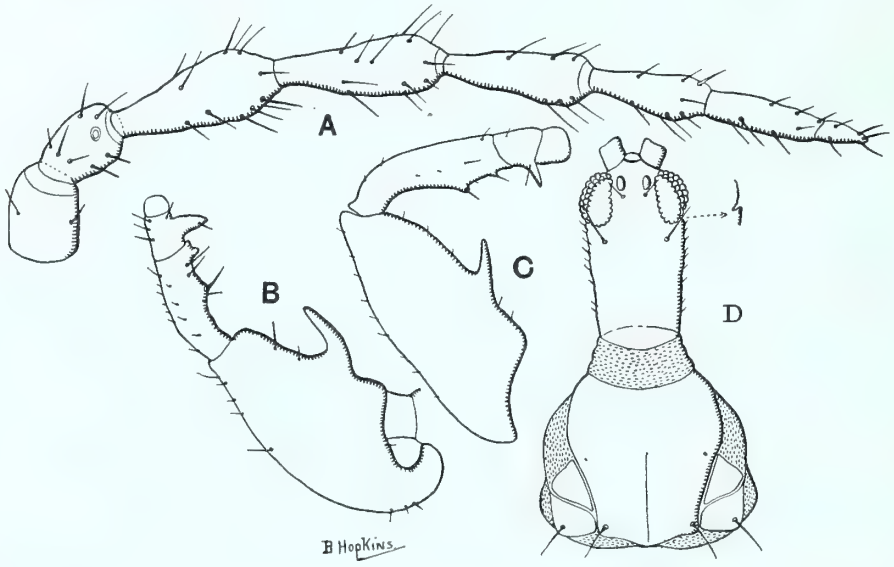
The fore-coxal and pronotal bristles are shorter than in *E. buxtoni* and stouter distally, being distinctly blunt and darker in colour.

The fore-wings have 15–15 duplicated cilia in the type (♀), but 13 in the ♂; the sub-basal bristles are dilated at the tip and unequally spaced, and the second is situated on a slightly higher plane; 1 and 2, and 2 and 3 are 42 μ and 60 μ apart respectively; 1 and 2 are practically straight, 3 is longer and curved, the respective lengths being 68, 79 and 98 μ.

The tube is 0·8 the length of the head, and 0·3 as broad at the base as long, while the terminal hairs are 0·8 as long as the tube; the lateral bristles on abdominal segment 9 are scarcely more than 0·6 as long as the tube.

Length of head and breadth across eyes and near base, 420, 260 and 180 μ respectively; length of post-ocular bristle 48 μ; total length of antenna 130 μ,

relative lengths and breadths of joints 3 to 8 respectively 120(54); 130(57); 122(42); 98(34); 90(26); and 48(15) μ. Length (and breadth) of pronotum, pterothorax and fore-wing 390(512); 675(620) and 1620(100) μ respectively. Length and breadth of femora and tibiae, I, 600(256); 270(90), II, 390(162); 338(73), and III, 500(190); 432(80) μ respectively. Breadth of abdomen



TEXT-FIG. 6.—*Euoplothrips uncinatus*, sp. n. A, antenna; B, fore-leg; D, head and thorax; C, *Euoplothrips incognitus*, sp. n., fore-leg.

500 μ; length of tube and breadth at base and apex, 338, 100 and 54 μ respectively.

The ♂ is slightly smaller and more slender but closely resembles the ♀; the 9th abdominal segment is furnished with the usual pair of spines, which are pointed and 48 μ in length.

The length of the head, and the breadth across the eyes and near the base are 390, 235 and 150 μ respectively, while the tube is only 284 μ in length, and 88 and 48 μ broad at base and apex respectively.

Upolu: Apia, 1 ♀ and 1 ♂ in galls of *Gynaikothrips hopkinsi* Bagn., 25.v.1925.

VIII. Description of a New Species of *Rhaebothrips*.

Genus Rhaebothrips Karny.

Supplementa Entomologica (*Deutsch. Ent. Mus.*), No. 2, p. 128, 1913.

The genotype *R. lativentris* was described by Karny from material from Formosa. In 1920 (*Acta Soc. Ent. Cech.*, xvii, p. 42) the same author recorded the winged form from Australia, and made further remarks in 1924 (*Arkiv für Zoologi, K. Svenska Vetenskapsakademien*, 17a, pp. 29–30, pl. IV, figs. 35 and 36).

The Australian record of *R. lativentris* K. is interesting in view of the discovery in Samoa of a second species of *Rhaebothrips*, as described below.

8. Rhaebothrips major, sp. n.

♀. Length about 3·5 mm.

Colour dark chestnut brown, fore-tibiae and tarsi not quite so dark; joints 1 and 5 to 8 concolorous with head, 2 distally paler, 4 dark grey-brown, but not so dark as 5 and 3 a shade less dark than 4, with extreme base pale. Bristles dark. Wings fumate, fore-wing with a dark blackish-brown median vein reaching to beyond commencement of the duplicated cilia; lower wing more lightly fumate, with a similar but thinner dark median vein, and a distinct brown line between it and fore-margin as long as median vein, but not so near to it as to fore-margin of wing.

Head to a line across fore-margin of eyes 1·6 times as long as greatest breadth; eyes small, about 0·23 the lateral length of head, vertex slightly produced as base for the antennae; cheeks somewhat arcuate from a little way behind eyes, sparingly spinulose, with a somewhat stouter genal seta behind eye. Mouth-cone very short, small. Post-ocular bristles very long (208 μ), over-reaching apex of first antennal joint; interocellar pair also long. Antennae long, twice as long as head to fore-margin of eyes; joints 3 and 4 elongate and somewhat claviform, subequal; relative lengths (and breadths) of joints 3 to 8 approximately as follows: 148(42); 140(40); 120(32); 86(34); 60(27); 43(19) μ.

Pronotum 0·7 to 0·75 as long as head, transverse and nearly twice as broad as long; bristles present, somewhat slender, pointed, those on posterior margin the longest, the outer being about 0·6 as long as median length of pronotum. Fore-coxal spine short. Fore-femur characteristic of the genus, bigger than

head, outer bend smoothly rounded, the inner geniculate, a long hair situated on inner margin before bend, and upper inner margin somewhat swollen before distal fourth or thereabouts; fore-tibia short, curved, and fore-tarsus with a massive tooth. Pterothorax quadrate, wider than pronotum. Wings long, fore-wing with 28 duplicated cilia.

Abdomen short, gently widening to segment 4 where it is widest, then rapidly narrowing to the tube with the facies of *Anactinothrips;* side margins of segment 8 angulate near middle. Tube approximately as long as head, and terminal hairs about 0·65 the length of the tube; abdominal bristles long and strong, those on 9 as long as tube.

Length (and breadth) of head, pronotum and pterothorax 370(232); 540(284); and 620(—) μ respectively. Length (and breadth) of wing 1485(108) μ.

Apart from its larger size, this species may readily be separated from *R. lativentris* K. by the coloration of the fore-legs and antennae, as well as by the longer series of duplicated cilia (28 compared with 17) in the fore-wing.

Upolu: Apia, 17.xi.1924.

LIST OF TEXT-FIGURES.

Text-fig. 1. *Dimorphothrips microchaetus*, sp. n. Posterior abdominal segments and tube.

„ 2. *Dimorphothrips solitus*, sp. n. A, head and thorax; B, fore-leg; C, posterior abdominal segments and tube; D, antenna.

„ 3. *Gynaikothrips hystrix*, sp. n. A, head and thorax; B, fore-leg; C, posterior abdominal segments and tube; D, antenna.

„ 4. *Gynaikothrips hopkinsi*, sp. n. A, head and thorax; B, fore-leg.

„ 5. *Euoplothrips buxtoni*, sp. n. A, antenna; B, head and thorax; C, fore-leg.

„ 6. *Euoplothrips uncinatus*, sp. n. A, antenna; B, fore-leg; D, head and thorax. C, *Euoplothrips incognitus*, sp. n., fore-leg.

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INSECTS OF SAMOA
AND OTHER SAMOAN TERRESTRIAL ARTHROPODA

LIST OF PARTS AND SYSTEM OF PUBLICATION:—

Part I. Orthoptera and Dermaptera.
,, II. Hemiptera.
,, III. Lepidoptera.
,, IV. Coleoptera.
,, V. Hymenoptera.
,, VI. Diptera.
,, VII. Other Orders of Insects.
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AND OTHER SAMOAN TERRESTRIAL ARTHROPODA

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